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ELLEN ROY HERZFELDER
Secretary

ROBERT W. GOLLEDGE, Jr.
Commissioner

December 2003

Dear Citizen,

I am pleased to present the *2001 Progress Report on the Beyond 2000 Solid Waste Master Plan*. This report presents solid waste data for calendar year 2001 and provides highlights of program accomplishments in fiscal year 2003.

While Massachusetts has made progress towards meeting the goals laid out in the *Beyond 2000 Solid Waste Master Plan*, we clearly face new and different challenges than we did three years ago. Both state and local government funding and staffing have been cut substantially over the past two years and budget projections show that this downward trend will continue before it improves. Clearly, we can no longer do everything that we committed to in the *2000 Master Plan*, particularly in terms of financial assistance to municipalities.

Given the reality that we face today, DEP must re-evaluate the *2000 Master Plan* strategies and goals, identify what *Master Plan* commitments DEP and others can continue to implement, and which need to be modified or eliminated. This evaluation will likely result in revisions to the existing *Master Plan*. I anticipate that this review process will occur next year, with proposed modifications, if necessary being proposed in the fall of 2004.

DEP will work closely with its Solid Waste Advisory Committee to ensure full stakeholder participation in this review. I look forward to working with you to ensure that the Massachusetts Solid Waste Master Plan recognizes and addresses both the challenges and opportunities we face in managing our waste for the remainder of this decade.

Sincerely,

Robert W. Golledge, Jr.
Commissioner

This information is available in alternate format. Call Aprel McCabe, ADA Coordinator at 1-617-556-1171. TDD Service - 1-800-298-2207.

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Massachusetts Department of Environmental Protection
Executive Office of Environmental Affairs

2001 Progress Report
on the
Beyond 2000 Solid Waste Master Plan

December 2003

Executive Summary

In the *Beyond 2000 Solid Waste Master Plan* (*Master Plan*), the Executive Office of Environmental Affairs (EOEA) and the Department of Environmental Protection (DEP) established a plan and vision for how Massachusetts will manage its solid waste for the next decade. In the *Master Plan*, DEP committed to providing annual reports on our solid waste and waste reduction data and our progress towards our waste reduction goals.

This *2001 Progress Report* is the second of these annual updates. This report includes the following sections:

- Solid waste data for calendar year 2001 and updated waste reduction rates and waste management capacity projections based on this data
- An update on waste reduction program accomplishments in fiscal year 2003

Progress in Meeting Waste Reduction Milestones

One of the Commonwealth's goals is to achieve a 70 percent waste reduction rate by 2010, as laid out in the *Beyond 2000 Solid Waste Master Plan (2000 Master Plan)*. In 2001, Massachusetts recorded:

- An overall waste reduction rate of 57 percent (the same as in 2000[1])
  (Note: This includes recycling and source reduction of both municipal solid waste (MSW) and construction and demolition (C&D) debris.);
- An overall recycling rate of 46 percent (a decrease of two percent from the previous year) *(Note: This includes recycling of both MSW and C&D debris.)*; and
- For the second consecutive year, a drop in the overall volume of waste disposed (down 2 percent from 2000).

Another key goal in the *2000 Master Plan* is to achieve convenient access for collection of hazardous products for 100 percent of households and small businesses. While there is still a large gap to fill for access for small businesses, nearly 85 percent of Massachusetts residents now have convenient access to hazardous products collection programs.

Environmental and Economic Benefits of Recycling

Recycling and waste reduction contribute important environmental and economic benefits to the Commonwealth. In 2001, Massachusetts prevented the need for 18 new 1,500 ton per day disposal facilities through a combination of source reduction and recycling. Waste reduction slows global warming, conserves natural resources, saves energy, and prevents pollution. By recycling and composting in 2001, Massachusetts is estimated[2] to have:

- Reduced greenhouse gas emissions by more than 1.1 million tons of carbon equivalent per year.
- Saved nearly 13 trillion BTUs of energy, equivalent to the annual energy consumption of 120,000 households, 2.2 million barrels of oil, or more than 100 million gallons of gasoline.
- Saved nearly 500,000 tons of iron ore, coal, and limestone and saved more than 17 million trees.

[1] 2000 Waste Reduction was originally reported as 54% in the 2000 progress report. However, due to use of updated economic indicator data, this rate was recalculated accordingly.
[2] Source: *Recycling Environmental Impacts Model*, Northeast Recycling Council, October 2003.

In addition, recycling bolsters the state's economy. Recycling, reuse, and remanufacturing directly support 19,000 jobs in Massachusetts, maintain a payroll of nearly $600 million, and bring in annual revenues of $3.6 billion. Total direct and indirect economic activity from recycling, reuse, and remanufacturing is estimated to generate more than $142 million annually in state revenues for Massachusetts[3].

Waste Management Capacity Projections

The *2000 Master Plan* set a goal of no net export or import of solid waste by 2006 and recognized that in addition to aggressive waste reduction, additional landfill capacity was needed to maintain a balanced waste management system. Since the 2000 Progress Report was issued, the Department of Environmental Protection (DEP) permitted approximately 100,000 tons of additional landfill capacity in 2002 through expansions of existing landfills or extension of permits. In addition, DEP extended the permits of two facilities for future years (2003-2007). To reach the no net export/import goal, DEP will continue to pursue aggressive waste reduction strategies and consider permit applications for new and expanded landfill capacity up to an average of 570,000 tons per year over the next three years. However, permitting of additional capacity is dependent upon proposals brought forward by the private sector and municipalities.

FY2003 Waste Reduction Highlights

In FY03, EOEA and DEP received a total of $5.3 million in funding from the Clean Environment Fund to support a wide range of recycling and waste reduction programs and projects. This was more than a $10 million decrease compared with FY02 funding levels. As a result, DEP awarded very limited grants in FY03 compared with FY02, but provided extensive assistance, training, and workshops relying on in-house staff. Highlights from these programs are listed below:

- **Product Stewardship:** Continued participation in the National Electronics Product Stewardship Institute (NEPSI) dialogue on electronics; fostered the development of the National Carpet Product Stewardship Agreement, which included grant awards for carpet reuse and recycling; initiated discussions with manufacturers on pilot take-back programs for wallboard, electronics, and propane tanks.
- **Source Reduction:** Supported the development of new Pay-As-You-Throw (PAYT) programs that will begin in FY04 in eight municipalities; established new Source Reduction criteria for the FY03 Municipal Recycling Incentive Program; provided the design for DEP's Junk Mail Reduction Kit to municipalities, enabling them to order nearly 30,000 additional kits to distribute.
- **Hazardous Products Collection:** Supported existing and new municipal Household Hazardous Product (HHP) collection programs, including coordinating the development of shared collection opportunities across multiple towns; developed a training manual and supported the development of school chemical management programs; worked with municipal waste combustors, municipalities, hospitals, dentists, and utilities, and other groups to reduce the use of mercury-containing products and remove mercury from the waste-stream.
- **Commercial Recycling and Composting:** Kicked off the Supermarkets Organics Recycling Initiative, including providing technical assistance to more than 10 supermarkets and completing a supermarket handbook; supported the development of Resource Management contracting at three businesses and institutions; held the Organics Summit in March 2003; established a WasteWise partnership with EOEA; established business recycling partnerships in 10 municipalities.

[3] *Recycling Economic Information Study*, prepared for the Northeast Recycling Council by R.W. Beck, Inc, June 2000.

- **Residential Recycling and Composting:** Provided hands-on technical assistance to more than 20 municipalities through MRIP coordinators and DEP staff; held extensive workshops and training events for municipal officials on a wide range of issues such as solid waste and recycling contracting, source reduction in municipal operations, pesticide use reduction, and building business recycling partnerships; awarded $1.3 million in Municipal Recycling Incentive Program (MRIP) payments to more than 200 municipalities prior to MRIP being suspended for the second half of FY03 due to budget cuts; provided targeted grants for recycling equipment and outreach.
- **Recycling Education:** Established the school Green Team program which attracted the participation of 220 schools and 25,000 students and the establishment or expansion of 18 school recycling programs; supported targeted outreach and Community Based Social Marketing projects; supported the web-based Earth's 911 service to provide residents with information on their local recycling programs through the web.
- **Market Development:** Provided three grants through the Recycling Industries Reimbursement Credit grant program, leveraging $150,000 in matching funds; closed two loans through the Recycling Loan Fund, leveraging more than $2.5 million in additional financing; continued to support Buy Recycled purchasing initiatives for state government, municipalities, and businesses.
- **Construction and Demolition Debris (C&D):** Worked extensively with DEP's C&D Subcommittee and workgroups to develop draft regulations and guidance to ban the disposal of certain C&D debris; conducted and supported research and technical assistance to increase reuse and recycling of C&D; supported pilot source separation projects; completed a wood markets analysis.
- **Solid Waste Regulations and Enforcement:** Conducted more than 300 waste ban inspections; conducted waste ban outreach to businesses; drafted regulatory revisions to the solid waste permitting regulations at 310 CMR 19.000; issued guidance on landfill liner requirements; issued policy to support pilot sharps collection program; oversaw the development of grading and shaping closure plans and activities at 15 closed landfills.
- **Comprehensive Waste Reduction Program Assessment:** Contracted with the Tellus Institute to conduct a comprehensive waste reduction program assessment, analyzing waste reduction potential by waste sector and developing program recommendations by sector to prioritize efforts to meet the *2000 Master Plan* waste reduction goals.

Section 1: 2001 Solid Waste Data and Waste Management Capacity Projections

To assist in implementing the *Beyond 2000 Solid Waste Master Plan*, DEP annually collects and analyzes solid waste management system data. This data is used to track progress in meeting waste reduction milestones and to determine the amount of disposal capacity that may be permitted to maintain a balanced waste management system. DEP has updated solid waste data for calendar year 2001 and revised waste management capacity projections for the next ten years based on the 2001 data. A description of how DEP collects and analyzes solid waste data can be found in Appendix A.

In 2001, DEP changed the way certain rates are calculated and added a new category called "C&D Other Diversion". This category was added to better account for management activities such as using C&D fines for landfill cover and burning wood for fuel. Tonnage of these materials was not counted in the past. While not considered to be recycling, these management activities are a type of diversion from disposal. Therefore, these materials are labeled as "C&D Other Diversion" and are included in the Overall Waste Reduction, Overall Diversion, Non-MSW Waste Reduction, and C&D Diversion rates.

Briefly, DEP calculates the following rates:

$$\text{Overall Waste Reduction Rate} = \frac{(\text{MSW Recycling}^{4} + \text{Source Reduction}^{5}) + (\text{C\&D Recycling} + \text{Source Reduction} + \text{Other Diversion})}{\text{Total Potential Generation}^{6}}$$

$$\text{MSW Waste Reduction Rate} = \frac{\text{MSW Recycling} + \text{Source Reduction}}{\text{MSW Potential Generation}}$$

$$\text{Non-MSW Waste Reduction Rate} = \frac{\text{Non-MSW Recycling} + \text{Source Reduction} + \text{C\&D Other Diversion}}{\text{Non-MSW Potential Generation}}$$

$$\text{MSW Recycling Rate} = \frac{\text{MSW Recycling}}{\text{MSW Actual Generation (Recycling + Disposal)}}$$

$$\text{C\&D Recycling Rate} = \frac{\text{C\&D Recycling}}{\text{C\&D Actual Generation (Recycling + Other Diversion + Disposal)}}$$

$$\text{C\&D Diversion Rate} = \frac{\text{C\&D Recycling} + \text{C\&D Other Diversion}}{\text{C\&D Actual Generation (Recycling + Other Diversion + Disposal)}}$$

Progress in Meeting Waste Reduction Milestones

Table 1 summarizes waste reduction rates in 2000 and 2001. Waste reduction includes source reduction (preventing waste from being generated), recycling (including composting), and other C&D diversion.[7] Total waste reduction remained level at 57% in 2001[8]. Municipal solid waste (MSW) waste reduction decreased to 43%, down from 44%, and non-municipal solid waste (Non-MSW) waste reduction increased to 81%, up from 78% in 2000.

[4] MSW recycling includes both recycling and off site-composting, but does not include home composting, which is considered source reduction.
[5] Source reduction refers to the difference between potential generation and actual generation.
[6] Potential generation refers to what generation would have been without source reduction.
[7] For a discussion of how DEP measures waste reduction, see page 3-7 of the Beyond 2000 Solid Waste Master Plan.
[8] 2000 Waste Reduction was originally reported as 54% in the 2000 progress report. However, due to use of updated economic indicator data, this rate was recalculated accordingly.

Table 1 Waste Reduction Rates Based on *Potential* Generation			
	2000	**2001**	**2010 Milestone**
Total Waste Reduction Rate	57%	57%	70%
MSW Waste Reduction Rate	44%	43%	60%
Non-MSW Waste Reduction Rate	78%	81%	88%

Table 2 shows recycling rates based on actual generation. Please see Figure 1 for a graphical description of the differences between waste reduction and recycling rates. Of the total waste that was generated, 46% was recycled in 2001, down from 48% in 2000[9]. The MSW recycling rate was flat from 2000 to 2001 at 34%. The C&D recycling rate was 69% in 2001, down from 73% in 2000.

Table 2 Recycling Rates Based on Actual Generation[10]		
	2000	**2001**
Overall Recycling	48%	46%
MSW Recycling *	34%	34%
C&D Recycling	73%	69%

*Excludes backyard composting which is source reduction

Environmental and Economic Benefits of Recycling

In 2001, Massachusetts prevented the disposal of 8.3 million tons of waste through a combination of source reduction, recycling, and other diversion, saving enough landfill space to eliminate the need for 18 landfills each equal to the state's largest (1,500 tons per day). Waste reduction also slows global warming, conserves natural resources, saves energy, and prevents pollution. By source reducing, recycling, or composting municipal solid waste alone in 2001, Massachusetts is estimated[11] to have:

- Reduced greenhouse gas emissions by more than 1.1 million tons of carbon equivalent per year.
- Saved nearly 13 billion BTUs of energy, equivalent to the annual energy consumption of 120,000 households, 2.2 million barrels of oil, or more than 100 million gallons of gasoline.
- Saved nearly 500,000 tons of iron ore, coal, and limestone and saved more than 17 million trees.

In addition, recycling bolsters the state's economy. Recycling, reuse, and remanufacturing directly support 19,000 jobs in Massachusetts, maintain a payroll of nearly $600 million, and bring in annual revenues of $3.6 billion. Total direct and indirect economic activity from recycling, reuse, and remanufacturing is estimated to generate more than $142 million annually in state revenues for Massachusetts[12].

[9] The overall recycling rate (48%) and the C&D recycling rate (73%) shown for 2000 are different than that published in the 2000 Progress Report because they were recalculated counting C&D Other Diversion as part of generation.
[10] Includes C&D Other Diversion as generation, but not recycling. This was not counted as generation in the past.
[11] Source: *Recycling Environmental Impacts Model*, Northeast Recycling Council, October 2003.
[12] *Recycling Economic Information Study*, prepared for the Northeast Recycling Council by R.W. Beck, Inc, June 2000.

Solid Waste Management 1997 – 2001

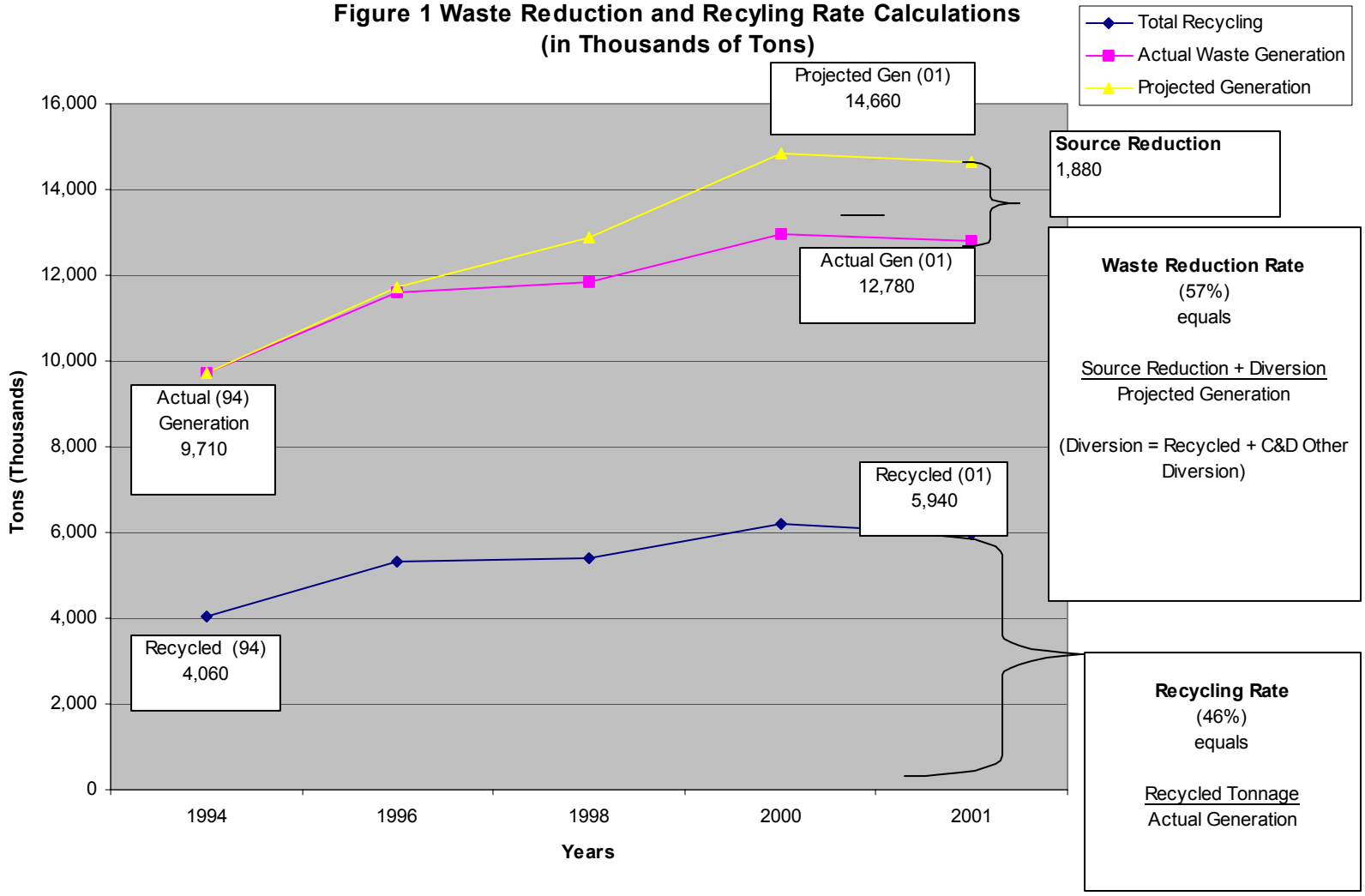
Table 3 presents a comprehensive picture of the management of solid waste in Massachusetts for calendar years 1997-2001.

Table 3
Solid Waste Management 1997-2001 (in tons per year)

	1997	1998	1999	2000**	2001**
Potential Generation	**12,120,000**	**12,900,000**	**13,870,000**	**14,850,000**	**14,660,000**
MSW	7,770,000	8,270,000	8,890,000	9,520,000	9,400,000
Non-MSW	4,350,000	4,630,000	4,980,000	5,330,000	5,260,000
Source Reduction	**770,000**	**1,070,000**	**1,320,000**	**1,890,000**	**1,880,000**
MSW	610,000	900,000	1,300,000	1,530,000	1,270,000
Non-MSW	160,000	170,000	20,000	360,000	610,000
Total Generation	**11,350,000**	**11,840,000**	**12,550,000**	**12,960,000**	**12,780,000**
MSW	**7,150,000**	**7,380,000**	**7,590,000**	**7,990,000**	**8,130,000**
Residential	3,140,000	3,110,000	3,130,000	3,130,000	3,130,000
Commercial	4,010,000	4,270,000	4,460,000	4,860,000	5,000,000
Non-MSW	**4,190,000**	**4,460,000**	**4,950,000**	**4,970,000**	**4,650,000**
C&D	3,840,000	4,270,000	4,700,000	4,780,000	4,540,000
Other	350,000	190,000	250,000	190,000	110,000
Diversion	**4,960,000**	**5,410,000**	**6,040,000**	**6,500,000**	**6,450,000**
MSW	2,060,000	2,290,000	2,520,000	2,700,000	2,780,000
Residential Recycling	490,000	500,000	510,000	470,000	520,000
Commercial Recycling	1,020,000	1,220,000	1,440,000	1,640,000	1,640,000
Residential Composting	360,000	350,000	350,000	340,000	340,000
Commercial Composting	190,000	220,000	220,000	250,000	280,000
Non-MSW	2,900,000	3,120,000	3,520,000	3,800,000	3,660,000
C&D Recycling	2,900,000	3,120,000	3,520,000	3,480,000	3,150,000
C&D Other Diversion				320,000	510,000
Disposal	**6,380,000**	**6,430,000**	**6,510,000**	**6,460,000**	**6,340,000**
In-State Disposal	5,860,000	5,400,000	4,960,000	4,830,000	4,840,000
Landfill	2,620,000	2,260,000	2,020,000	1,760,000	1,710,000
MSW	1,430,000	1,060,000	960,000	1,010,000	1,030,000
C&D	890,000	1,070,000	920,000	660,000	620,000
Other	300,000	140,000	140,000	90,000	60,000
Combustion	3,240,000	3,140,000	2,940,000	3,070,000	3,130,000
MSW	3,230,000	3,130,000	2,940,000	3,060,000	3,130,000
Non-MSW	10,000	*0	*0	*0	*0
Net Exports	520,000	1,030,000	1,550,000	1,630,000	1,500,000
Exports	860,000	1,210,000	1,650,000	1,770,000	1,690,000
Imports	340,000	180,000	100,000	140,000	190,000

*Non-MSW combustion was less than 5,000 tons
** For 2000 and 2001, total generation includes "other C&D Diversion" tonnage that was not included in previous years.
Note: Numbers do not all add exactly due to rounding.

Figure 1 Waste Reduction and Recyling Rate Calculations (in Thousands of Tons)



In 2001, potential generation was 14.7 million tons. This is a calculated figure used to estimate what generation would be without source reduction. DEP uses a method similar to that used by the U.S. Environmental Protection Agency to calculate potential generation and, thereby, source reduction[13]. Source reduction was approximately 1.9 million tons in 2001.

In 2001, 12.8 million tons of solid waste were *actually* generated in Massachusetts. Of this amount, 8.1 million tons were MSW (63%) and 4.7 million tons were Non-MSW (37%). Between 2000 and 2001, total waste generation decreased 1%, from 13.0 million tons to 12.8 million tons. This compares to a 1% increase in generation from 1999 to 2000. Of the 12.8 million tons generated, 6.4 million tons (50%) were diverted (includes recycling, composting, and other diversion) and 6.3 million tons (50%) were disposed.

In 2001, 6.3 million tons (50%) of the total waste generated were disposed. The amount of total waste requiring disposal decreased by 2% from 2000 to 2001. 4.8 million tons (38%) of total waste generated were disposed in-state either by landfilling (35% of disposal) or by combustion (65% of disposal). In 2001, there were 21 landfills and 7 combustors operating in the state that received MSW and/or Non-MSW. These combustion facilities produce approximately 200 megawatts of electricity each year. The state exported for disposal 1.7 million tons and imported 0.2 million tons, and thus was a net exporter of 1.5 million tons (12%) of total waste generated. See Table 16 and 17 on page 19 for more detailed import/export data by state.

Figure 2
Total Solid Waste Generation in 2001

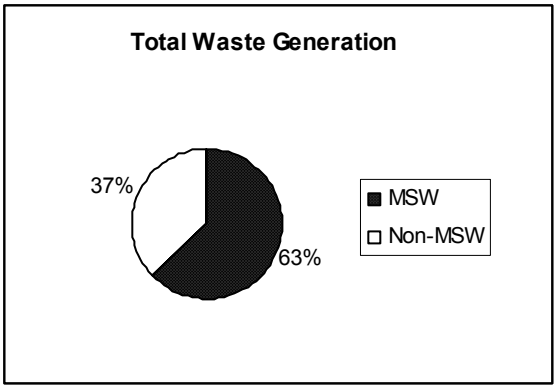


Table 4 shows the calculation of total waste reduction in 2001. Waste reduction is the combined effect of source reduction, recycling, and other C&D diversion as a percentage of *potential* waste generation. The 40 percent recycling rate shown below is lower than the overall 46 percent recycling rate because it is based on potential, rather than actual, generation. This table shows that, while recycling currently comprises most waste reduction tonnage, source reduction also plays an important role.

Because DEP does not directly measure source reduction, we do not have the ability to attribute specific amounts of source reduction tonnage to specific activities. However, we do know that certain practices such as Pay-As-You-Throw and home composting contribute significantly to source reduction. A specific example is that reported purchases of newsprint dropped 39 percent from 2000 to 2001 in Northeast states, a drop of about 1 million tons in just one year.

[13] See page 3-7 of the Beyond 2000 Solid Waste Master Plan; see also EPA's National Source Reduction Characterization Report, November 1999.

Table 4 2001 Total Waste Reduction (in tons)	
Potential Generation without Source Reduction	14,660,000
Source Reduction	1,880,000
% of potential generation	*13%*
Recycling*	5,940,000
% of potential generation	*40%*
C&D Other Diversion	510,000
% of potential generation	*3%*
Total Waste Reduction	8,330,000
% of potential generation	57%
* The recycling rate is 46% when based on *actual* generation.	

Note: Percentages do not add exactly due to rounding.

Municipal Solid Waste Management

In 2001, 8.1 million tons of MSW were generated in Massachusetts, or 7.0 pounds per person per day. Of this amount, 34% was recycled (including off-site composting, but excluding on-site backyard composting)[14]. The per capita MSW recycling rate was 2.4 pounds per person per day, and the per capita disposal rate (including export) was 4.6 pounds per person per day. The residential recycling rate (excluding home composting) was 27% and the commercial recycling rate was 38%.

Table 5 How MSW was managed in 2000 and 2001		
	2000	**2001**
Recycled	34%	34%
Combusted	38%	38%
Landfilled	13%	13%
Net Exported	15%	15%

Between 2000 and 2001

- MSW generation increased 2%, from 8 million tons to 8.1 million tons. Per capita MSW generation rose from 6.9 pounds per person per day to 7.0 pounds per person per day.
- Residential MSW generation remained constant at 3.1 million tons, while commercial MSW generation increased 3% from 4.9 million tons to 5 million tons.
- MSW recycling increased from 2.7 million tons to 2.8 million tons.
- Total MSW disposal (disposal in-state and exported out of state for disposal) decreased 1% from 5.4 million tons to 5.3 million tons.
- MSW net exports for disposal decreased 2%, from 1.22 million tons to 1.19 million tons.

[14] When backyard composting is included, as DEP has reported in the past, the MSW recycling rate is 38%.

Figure 3
Breakdown of MSW Materials Recycled
(excluding composting)

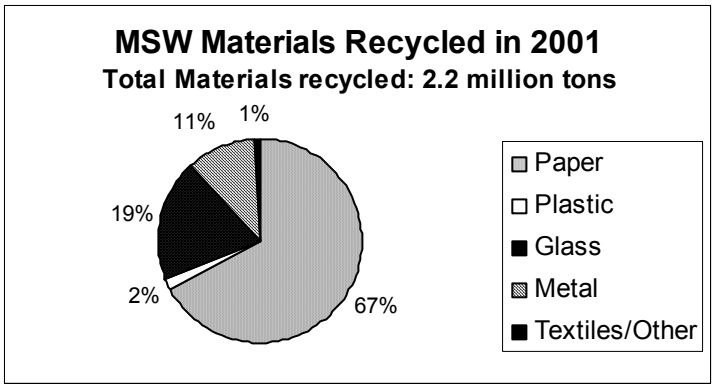


Table 6 shows the calculation of MSW waste reduction in 2001. Waste reduction is the combined effect of source reduction and recycling as a percentage of *potential* waste generation.

Table 6 **2001 MSW Waste Reduction (in tons)**	
Potential MSW Generation without Source Reduction	9,400,000
Source Reduction *% of potential generation*	1,270,000 *14%*
Recycling* *% of potential generation*	2,780,000 *30%*
Total Waste Reduction *% of potential generation*	4,040,000 *43%*
*The recycling rate is 34% when based on *actual* MSW generation Note: percentages do not add exactly due to rounding.	

Municipal recycling rates by fiscal year are shown in Table 7. This table shows that the distribution of municipal recycling rates has not changed substantially over the past five years. Please note that DEP did not collect FY02 municipal recycling data because we switched to a calendar year datasheet time frame to match other solid waste reporting. CY02 data is not complete at this time.

Table 7 **Municipal Recycling Rates**					
Municipalities Achieving:	**FY97**	**FY98**	**FY99**	**FY2000**	**FY2001**
>30%	181	181	182	162	182
20-29%	86	90	82	68	73
10-19%	53	46	43	40	34
5-9%	12	11	13	2	7
Not included due to incomplete or missing data	19	23	31	79	55

Non-MSW Waste Management

In this Progress Report, DEP has changed the way C&D generation is calculated. In order to account for the increasing amount of C&D being diverted as C&D fines for landfill cover and C&D wood being burned for fuel[15], a new category of C&D Other Diversion was added to account for these beneficial uses. This tonnage is counted as generation, but not as recycling or disposal, since use of fines for landfill cover and wood for fuel are considered neither recycling nor disposal activities. However, these activities are considered diversion since they divert material from disposal and free up capacity for other materials.

In order to compare 2001 data to 2000 data, DEP adjusted the 2000 data to include other C&D diversion in the C&D figures. The data presented for 2000 in this Progress Report is therefore different from the tonnages reported in the 2000 Solid Waste Progress Report.

In 2001, 4.6 million tons of C&D were generated in Massachusetts, down from 4.8 million tons in 2000. Of the amount generated, 69% was recycled in 2001, down from 73% recycled in 2000. Including C&D diversion with recycling, the C&D diversion rate was 81%. Table 8 shows how C&D was managed in 2001 compared with 2000.

Table 8
C&D Management in 2001

	2000	2001
Generated	4,780,000	4,550,000
Disposed	980,000	890,000
• **In-State**	660,000	620,000
• **Out-of-State**	320,000	270,000
Diverted	3,800,000	3,670,000
• **Recycled**	3,480,000	3,150,000
o ***Asphalt, Brick, and Concrete (ABC)***	3,300,000	2,830,000
o ***Metal***	70,000	80,000
o ***C&D wood***	20,000	40,000
o ***Wood Waste***	40,000	180,000
o ***Other****	80,000	60,000
• **C&D Other Diversion**	320,000	520,000
o **C&D Fines**	290,000	380,000
o **C&D Wood for Fuel**	10,000	140,000

*The increase in wood waste is due to a change in the survey used to collect 2001 data. For 2001, processors were asked to report wood waste in addition to C&D Wood and Wood for Fuel. This differs from previous years, when DEP did not specifically request wood waste recycling data. This is primarily wood waste, such as land clearing debris handled through a C&D processor, but also includes materials such as pallets.
**Other materials include ceiling tiles, carpet, gypsum wallboard, and asphalt roofing shingles.

Table 9 shows the calculation of non-MSW waste reduction in 2001. Waste reduction is the combined effect of recycling, source reduction, and other C&D diversion as a percentage of *potential* generation.

[15] In addition, beginning in 2002, C&D residuals began to be used for inactive landfill closures.

Table 9 2001 Non-MSW Waste Reduction (in tons)	
Potential generation without source reduction	**5,260,000**
Source Reduction *% of potential generation*	610,000 *12%*
Recycling* *% of potential generation*	3,150,000 *61%*
C&D Other Diversion *% of potential generation*	510,000 *10%*
Total Waste Reduction *% of potential generation*	4,270,000 *81%*
* The recycling rate is 69% based on *actual* generation. Note: percentages do not add exactly due to rounding.	

Other Non-MSW Management

A relatively small amount of non-MSW materials other than C&D are disposed in Massachusetts landfills or sent out of state for disposal each year. In 2001, 67,000 tons of these materials were disposed, including asbestos, industrial waste, medical waste, wood waste, ash and sludge.

In addition, a significant amount of other non-MSW materials are managed each year in management systems that have in the past been tracked separately from the primary MSW/C&D waste management system. These include MSW combustion ash disposal, use of materials as alternative daily cover at landfills (both active and inactive), and other beneficial uses of materials in non-landfill applications. Although these materials are not counted in Table 3 of this report (except for C&D fines used as alternative landfill cover and as wood for fuel), DEP has begun to track these materials more closely since they affect and are affected by MSW and C&D management. The management of the largest categories of these materials is summarized below.

Materials Used for Daily Cover

Table 10 shows materials used as daily cover at landfills.

Table 10 Reported Daily Cover Material at Active Landfills (in tons)[16]			
	1999	**2000**	**2001**
Soil Sand	450,000	500,000	420,000
Contaminated Soils	330,000	300,000	260,000
C&D Fines	230,000	210,000	190,000
ASR	160,000	120,000	120,000
Other Materials[17]	240,000	240,000	280,000
TOTAL	1,420,000	1,370,000	1,280,000

[16] Daily Cover tonnages have been revised for consistency across time, and do not include material disposed at Quarry Hills, since this is not an active landfill.

[17] "Other Materials" includes approximately 20 various materials such as ground asphalt and DPW wastes.

Municipal Waste Combustor Ash

There are currently 7 waste-to-energy combustors operating in Massachusetts. In 2001, these combustors generated approximately 900,000 tons of combustion ash (excluding recovered post-burn metals). The majority of the ash was disposed in one of 6[18] MSW combustion ash mono-fills located in Massachusetts. A number of these mono-fills are nearing their capacity, and efforts are underway by a number of combustors to expand capacity. The current status of these ash landfills is summarized in Table 11.

Table 11
Active MSW Combustion Ash Landfills

Municipality	Site Name	Current Permit Expires
Agawam	Bondi's Island Ash Landfill	2004
Peabody	Peabody Ash Landfill	2006
Saugus	Wheelabrator Ash Landfill	2007
Shrewsbury	Shrewsbury Ash Landfill	2008
Haverhill	Ward Hill Neck Ash Landfill	2009
Carver	CMW Ash Landfill	2013

Other Non-MSW Management

In addition to materials used for daily cover at landfills and MSW combustion ash discussed above, Table 12 summarizes several other large categories of non-MSW management that DEP tracks. Beginning in 2002, based on several projects, DEP anticipates that increasing amounts of materials such as C&D residuals will be used for grading and shaping at inactive landfill closures.

Table 12
Other Non-MSW Management in 2001

Material Type	Estimated Amount Generated[19]	How Managed
Coal Ash	140,000 tons	• beneficial uses (e.g. use in cement, flowable fill)
Contaminated Soil	420,000 tons	• asphalt batching (340,000 tons) • inactive landfill grading and shaping (80,000 tons)
Marine Dredge Sediments	140,000 tons	• open ocean reuse or aquatic disposal (90,000 tons) • other beneficial reuse (e.g., beach nourishment, upland reuse)

Waste Management Capacity Projections

In the *Beyond 2000 Solid Waste Master Plan*, EOEA and DEP established a policy goal of achieving no net import or export of solid waste by 2006. To achieve this goal, the *2000 Master Plan* acknowledged that projected increases in waste reduction would not be enough to provide the management capacity needed by the state, and therefore allowed a phase in of additional landfill disposal capacity each year beginning in 2001. Since the 2000 Progress Report, DEP permitted approximately 100,000 tons of additional landfill capacity through expansions of existing landfills or extension of permits, short of the 544,000 tons allowed. In addition, DEP extended the permits of two facilities in future years, allowing an additional 365,000 tons of capacity in 2003 and 2004, an additional

[18] One of the 7 waste-to-energy combustors sends its combustion ash out of state.
[19] Not including material disposed of in solid waste facilities or used as daily cover in landfills.

511,000 tons of capacity in 2005 and 2006, and an additional 146,000 tons of capacity in 2007 beyond what was previously permitted.

Based on 2001 solid waste data, which shows decreasing generation and disposal, revised projections indicate an average need for 570,000 tons per year, or approximately 1.7 million tons over 3 years (2003-2005) (see Table 13). However, in order to prevent net import, less additional capacity could be permitted in 2004 than in 2003 and 2005. Additional disposal capacity would need to be permitted after 2005 to maintain sufficient disposal capacity to maintain a no net export status. However, while DEP will consider permit applications for new and expanded landfill capacity to meet the projected need, this additional capacity is dependent upon proposals brought forward by the private sector and municipalities. Table 13 below is a summary table based on data from Table 14, referenced below.

Table 13
Disposal Capacity Schedule*

	2002	2003	2004	2005
In-State Shortfall (Net Export)	1,080,000	1,030,000	850,000	1,700,000
Additional Allowed Capacity		570,000	270,000	870,000
Cumulative Allowed Capacity		570,000	840,000	1,710,000
Remaining Disposal Capacity Need (Assuming Allowed Capacity is met)		460,000	0	0

* Amounts in this summary chart are rounded to the nearest 10,000 tons.

Table 14 shows projected waste management capacity through 2011, using a baseline of 2001 solid waste data and the assumptions that generation will increase 1% per year (based on a 3 year rolling average from 1999 – 2001), MSW recycling will increase approximately 0.85% per year (based on a 3 year rolling average from 1999-2001), and C&D Diversion will increase 0.85% per year, until reaching a total of 88% in 2010.

Table 15 lists active and proposed landfill projects known to DEP. Unshaded numbers reflect currently permitted capacity. Shaded numbers reflect potential additional capacity that could be constructed at existing facilities, but is not yet permitted.

DEP recognizes that landfills are difficult to site and that currently proposed landfill projects may not match the disposal capacity needed by the state. Where waste is ultimately disposed is determined by a number of factors, including available disposal capacity and regional market conditions. It is not DEP's intent to control waste flow, but to allow enough local disposal capacity to meet the state's need. However, where competitively priced out-of-state disposal capacity exists, waste management companies and municipalities may choose to rely on this capacity and not seek to develop in-state capacity at this time. DEP will continue to monitor waste management capacity as the state implements the strategies in the *2000 Master Plan*.

Table 14

Waste Management Capacity Projections

	2001 Actual	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total Generation	**12,779,688**	**12,953,977**	**13,130,939**	**13,310,619**	**13,493,063**	**13,678,318**	**13,678,318**	**14,057,454**	**14,251,434**	**14,448,421**
MSW	8,130,474	8,211,779	8,293,896	8,376,835	8,460,604	8,545,210	8,630,662	8,716,969	8,804,138	8,892,180
Non-MSW	4,649,214	4,742,198	4,837,042	4,933,783	5,032,459	5,133,108	5,235,770	5,340,486	5,447,295	5,556,241
Total Recycling	**6,435,351**	**6,653,216**	**6,869,932**	**7,091,533**	**7,318,126**	**7,549,815**	**7,786,709**	**8,028,921**	**8,276,563**	**8,529,751**
	50%	**51%**	**52%**	**53%**	**54%**	**55%**	**57%**	**57%**	**58%**	**59%**
MSW Rate	34%	35%	36%	37%	38%	38%	39%	40%	41%	42%
MSW	2,776,443	2,874,007	2,973,246	3,074,181	3,176,838	3,281,241	3,387,414	3,495,382	3,605,171	3,716,806
C&D Diversion Rate	81%	81.4%	82.3%	83.1%	84.0%	84.8%	85.7%	86.5%	87.4%	88.2%
C&D Diversion	3,658,908	3,779,209	3,896,686	4,017,352	4,141,287	4,268,574	4,399,295	4,533,539	4,671,392	4,812,945
Combustion Capacity	**3,132,612**	**3,132,612**	**3,132,612**	**3,132,612**	**3,132,612**	**3,132,612**	**3,132,612**	**3,132,612**	**3,132,612**	**3,132,612**
Total Permitted LF Capacity	**1,710,997**	**2,088,064**	**2,102,848**	**2,240,748**	**1,330,348**	**1,232,403**	**1,085,570**	**456,850**	**456,850**	**456,850**
MSW	1,293,854	1,293,854	741,966	741,966	381,346	361,089	345,290	201,690	201,690	201,690
Non-MSW	417,143	794,210	1,360,882	1,498,782	949,002	871,314	740,280	255,160	255,160	255,160
Total Management Capacity	**11,278,960**	**11,873,892**	**12,105,392**	**12,464,893**	**11,781,086**	**11,914,830**	**12,004,891**	**11,618,383**	**11,866,025**	**12,119,213**
MSW Management	6,937,409	7,300,473	6,847,823	6,948,759	6,690,796	6,774,941	6,865,316	6,829,684	6,939,473	7,051,108
Non-MSW Management	4,341,551	4,573,419	5,257,568	5,516,135	5,090,290	5,139,888	5,139,576	4,788,699	4,926,552	5,068,105
Shortfall (Net Export)	**1,500,728**	**1,080,085**	**1,025,547**	**845,725**	**1,711,977**	**1,763,488**	**1,861,541**	**2,439,071**	**2,385,409**	**2,329,208**
MSW	1,193,065	911,306	1,446,073	1,428,077	1,769,808	1,770,268	1,765,346	1,887,284	1,864,665	1,841,071
Non-MSW	307,663	168,779	-420,526	-582,351	-57,831	-6,780	96,195	551,787	520,744	488,136
Cumulative Addl Disposal Capacity Needed for No Net Export			570,659	846,178	1,711,977	1,763,488	1,861,541	2,439,071	2,385,409	2,329,208
Projected Export			**454,888**	**-453**	**0**	**0**	**0**	**0**	**0**	**0**

Assumptions:

MSW Generation increases 1.0% per year
MSW Recycling Rate increases 0.85% per year
C&D Diversion Rate reaches 88% by 2010 and levels off (increases at .85% per year)
Additional Cumulative Disposal Capacity will be 571,072 tons per year until 2005. After 2005, additional capacity will be added to maintain non
In calculating C&D diversion, 100,000 tons of other non-MSW is subtracted from the non-MSW generation figure, so that this tonnage reflects C

Table 15
Projected Landfill Capacity (Tons Per Year)

Town	2001 Permitted Capacity	End of current permit	Lifetime of LF	Proposed increase in tonnage	date of proposed increase going online	new tonnage after new capacity	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Active Landfills																	
Amherst	30888	2002	**2002**			30888	30888	30888	0	0	0	0	0	0	0	0	0
Barre	93600	2007	**2013**			93600	93600	93600	93600	93600	93600	93600	93600	93600	93600	93600	93600
Bourne	146000	2006	**2024**			146000	146000	146000	146000	146000	146000	146000	146000	146000	146000	146000	146000
Carver	49980	2013	**2013**			49980	49980	49980	49980	49980	49980	49980	49980	49980	49980	49980	49980
Chicopee	365000	2007	**2010**			365000	365000	365000	365000	365000	365000	365000	365000	365000	365000	365000	0
Chilmark	2500	2003	**2004**			2500	2500	2500	2500	2500	0	0	0	0	0	0	0
Dartmouth	115000	2016	**2021**			115000	115000	115000	115000	115000	115000	115000	115000	115000	115000	115000	115000
Fall River	468000	2004	**2004**			468000	468000	468000	468000	468000	0	0	0	0	0	0	0
Gardner	93600	2005	**2005**			93600	93600	93600	93600	93600	93600	0	0	0	0	0	0
Granby	146000	2004	**2008**	89000	2004	235000	146000	146000	146000	235000	235000	235000	235000	235000	0	0	0
Hardwick	47928	2010	**2010**	45672	2002	93600	47928	93600	93600	93600	93600	93600	93600	93600	93600	93600	0
Hull	833	2006	**2006**			833	833	833	833	833	833	833	0	0	0	0	0
Middleborough	9620	2011	**2011**			9620	9620	9620	9620	9620	9620	9620	9620	9620	9620	9620	9620
Nantucket	7280	2015	**2015**			7280	7280	7280	7280	7280	7280	7280	7280	7280	7280	7280	7280
Northampton	50000	2007	**2017**			50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
Southbridge	180960	2019	**2019**			180960	180960	180960	180960	180960	180960	180960	180960	180960	180960	180960	180960
Sturbridge	410	2016	**2016**			410	410	410	410	410	410	410	410	410	410	410	410
Taunton	120120	2007	**2007**			120120	120120	120120	120120	120120	120120	120120	120120	0	0	0	0
Warren	2000	2005	**2005**			2000	2000	2000	2000	2000	2000	0	0	0	0	0	0
Wayland	2345	2005	**2011**			2345	2345	2345	2345	2345	2345	2345	2345	2345	2345	2345	2345
Westminster	156000	2004	**2013**	140400	2004	296400	156000	156000	156000	296400	296400	296400	296400	296400	296400	296400	296400
Inactive Landfills																	
South Hadley	0		2016	146000	2003	146000	0	0	146000	146000	146000	146000	146000	146000	146000	146000	146000
TOTAL PERMITTED CAPACITY							**2,088,064**	**2,088,064**	**2,102,848**	**2,240,748**	**1,330,348**	**1,232,403**	**1,085,570**	**456,850**	**456,850**	**456,850**	**363,250**
Instate Shortfall (Net Export)							**1,500,728**	**1,080,085**	**1,025,547**	**845,725**	**1,711,977**	**1,763,488**	**1,861,541**	**2,439,071**	**2,385,409**	**2,329,208**	**2,364,001**
TOTAL POTENTIAL CAPACITY							**2,088,064**	**2,133,736**	**2,248,848**	**2,478,248**	**2,007,748**	**1,912,148**	**1,911,315**	**1,791,195**	**1,556,195**	**1,556,195**	**1,097,595**
Instate Shortfall (Net Export)							**1,500,728**	**1,035,767**	**880,865**	**609,505**	**1,035,817**	**1,084,941**	**1,036,949**	**1,105,833**	**1,287,121**	**1,230,869**	**1,630,608**

KEY:

Permitted Capacity	number without shading
Potential Additional Capacity	number with shading

The export and import data for Massachusetts was collected from annual facility reports (AFR) submitted to DEP and from calling other states directly. In some instances, the export data provided in the AFR differed from that reported from the states. In order to make the most conservative estimate of export, the higher number from the two sources was used. For example, if in the Massachusetts AFR, it was reported that Massachusetts sent Connecticut 10,000 tons of MSW, and Connecticut reported receiving 29,000 tons of MSW, we used 29,000 in our data.

Table 16
Export Data by State

	CT	ME	NB*	NH	NY	OH	OU**	PA	RI	SC	VA	VT	TOTALS
C&D	125	64,688	350	6,476	103,174	129,873	76	8,511	2,602	23,482	7,652	685	**347,694**
MSW	29,502	196,404		249,259	442,528	13,040	46	15,609	9,605	335,927	180	3,053	**1,295,153**
Non-MSW				13	6,201			36,560	899		564		**44,237**
Total	29,627	261,092	350	255,748	551,903	142,913	122	60,680	13,106	359,409	8,396	3,738	**1,687,084**

* NB = New Brunswick, Canada
** OU = Other Unknown Location

Table 17
Import Data by State

Waste Class	CT	ME	NH	NY	RI	VT	TOTALS
C&D	69,382	8,908	374	23			**78,687**
MSW	27,408	8,334	31,060	14,316	16,576	4,394	**102,088**
Non-MSW	2,562	1,034	1,523		295	167	**5,581**
Total	99,352	18,276	32,957	14,339	16,871	4,561	**186,356**

Section 2: FY2003 Waste Reduction Programs Update

This section reports on the Department of Environmental Protection's (DEP's) and the Executive Office of Environmental Affairs' (EOEA's) waste reduction accomplishments and activities for fiscal year 2003 (FY03, July 2002 through June 2003). In FY02, bolstered by increased funding from the Clean Environment Fund, DEP and EOEA implemented extensive waste reduction programs and built up considerable momentum towards meeting the 2000 Master Plan waste reduction goals. However funding for waste reduction programs was cut dramatically from $15.8 million in FY02 to $5.8 million in FY03.

DEP expects funding to continue to decline at least through FY04. Looking ahead, DEP will continue to strive to develop innovative strategies that leverage limited resources to further reduce waste and protect public health and the environment. DEP will be establishing an FY04 implementation plan in Fall 2003, once the state budget and FY04 staffing levels have been set.

Source Reduction

In the *Beyond 2000 Master Plan*, EOEA and DEP placed an increased emphasis on source reduction. Source reduction refers to the design, manufacture, purchase or reuse of materials to reduce the quantity of material that is generated. By minimizing the amount of materials produced and used in the first place, source reduction is the most environmentally preferable strategy for reducing waste disposal. In addition to reducing the burden on the waste disposal infrastructure, source reduction also reduces the burden on the recycling infrastructure and prevents the consumption of natural resources. Source reduction accomplishments for FY03 include:

- **Green Team and Government Waste Reduction Programs -** This program was developed to promote more environmentally sound operations in government. FY03 accomplishments include:
    - DEP facilitated the work of the DEP Green Team and assisted in the coordination of state agency efforts with EOEA.
    - DEP implemented a Paperwork and Postage Reduction Initiative within its Boston and regional offices.
    - DEP staff represented the Department on the State Sustainability Council and Council Workgroups, including green buildings, recycling and waste reduction, and environmentally preferable products purchasing.

- **Municipal Recycling Incentive Program (MRIP) Criteria -** For FY03, DEP established MRIP elective criteria categories for both Source Reduction and, for the first time, Toxics Use Reduction. Although DEP was unable to implement Phase 2 of the FY03 MRIP program due to funding limitations, more than 200 municipalities took steps to reduce waste in the first half of FY03.

- **Home Composting Grant Program** – During FY03 DEP was not able to award additional home composting bin grants to established programs. However, DEP was able to provide support for the establishment of seven new programs by providing a limited number of home composting bins, workshops, and educational opportunities.

- **Junk Mail Reduction Kits -** DEP evaluated responses to junk mail reduction kits received from residents of municipalities that were awarded the kits. Of more than 2,000 responses, nearly all reported that they mailed in cards to remove their names from mailing lists and stated that they would recycle junk mail. More than half contacted credit card companies to have their names

removed from mailing lists. While funding limitations prevented DEP from printing additional kits, DEP provided the design for this kit to allow municipalities to print and distribute additional kits. As a result, municipalities ordered 27,500 additional kits.

- **College Reuse/Recycling Events:** DEP provided a technical assistance grant to prepare a how-to guide and hold workshops for college facility managers about how to capture reusable goods from college students when students move out at the end of the academic year. Two events conducted at Brandeis University and Tufts University captured more than 10 tons of furniture, clothing, appliances and other products for reuse.

- **Source Reduction Bookmarks –** DEP printed bookmarks with waste reduction tips and distributed these through municipalities that requested them on the FY03 recycling grant application. The bookmarks were printed on recycled content paper printing scraps, requiring no new paper to print.

Product Stewardship

As envisioned in the *Master Plan*, Product Stewardship refers to the concept that all parties responsible for the design, production, sale, and use of a product share responsibility for the full environmental impacts of the product throughout its life cycle. A key tenet of product stewardship is that manufacturers in particular should take greater responsibility for reducing product impacts. By placing greater responsibility for the end costs of products on manufacturers, product stewardship gives manufacturers strong economic incentives to change how they design and manufacture products, making them less toxic and more recyclable, and enabling consumers to make better informed purchasing choices by internalizing the costs of consumer products. Accomplishments in product stewardship for FY 2003 include:

- **National Carpet Product Stewardship Agreement** – DEP staff worked with other states and the carpet industry to foster the development of the Carpet America Recovery Effort (CARE). CARE is the industry-led organization responsible for achieving the goals of the national carpet agreement. This included awarding a $20,000 CARE grant for carpet reuse (one of three national grants awarded) to the Building Materials Resource Cooperative in Boston.
- **Electronics Product Stewardship** – Massachusetts continues to participate with the Product Stewardship Institute (PSI) in the National Electronics Product Stewardship Initiative (NEPSI). PSI coordinates the participation of over twenty states in this dialogue, including Massachusetts. NEPSI engages the electronics industry and other stakeholders in a product stewardship dialogue that aims to create a collection in recycling model where costs are shared by industry, government, and consumers.
- **Bottle Bill** – DEP administered redemption center registrations and developed policy recommendations in support of Governor Romney's proposal to expand the bottle bill. DEP continued to work with various stakeholders, including redemption centers, distributors, and retailers to handle issues regarding implementation of the bottle bill. DEP also served as a liaison to the Department of Revenue on their audit program of the Clean Environment Fund.
- **Benjamin Moore Paint Take Back Program** – DEP worked with Benjamin Moore and the Product Stewardship Institute to expand Benjamin Moore's program to take back Benjamin Moore paint from paint collection events from five Massachusetts towns.
- **Other Product Stewardship Dialogues** – DEP has initiated discussions with manufacturers on pilot programs to take back gypsum wallboard, electronics, and propane tanks for recycling.

Hazardous Products Collection Programs

In addition to establishing a waste reduction goal for reducing the amount of materials that we dispose, the *Master Plan* also establishes goals related to reducing the toxicity of the waste stream. The goal established in the *Master Plan* is to "Substantially reduce the use and toxicity of hazardous products and provide convenient collection services to all residents and very small quantity hazardous waste generators." Progress towards this goal and related efforts to reduce the toxicity of the Commonwealth's waste stream are summarized in this section. Accomplishments in hazardous products collection for FY 2003 include:

- **Municipal Collection Programs -** Although funding limitations in FY 2003 slowed program expansion efforts in this area, DEP achieved several accomplishments during this fiscal year including:
    - DEP awarded five grants for universal waste storage sheds to collect fluorescent lamps and other mercury containing products. Municipalities used these sheds to establish new collection programs for their residents.
    - DEP provided support to existing and newly created HHP collection programs by providing technical assistance to municipalities through DEP staff and Municipal Recycling Incentive Program (MRIP) Coordinators. This included assistance to develop shared regional collection programs that provide shared collection opportunities to residents of multiple towns.
    - DEP held a refresher training workshop for municipal officials on paint collection programs.

- **Mercury Elimination Strategy** – This strategy was developed by Massachusetts to reduce mercury emissions into the Commonwealth's air shed. During FY 2003 DEP implemented several activities which included:
    - DEP staff participated in state, regional, and national task forces and workgroups to implement a Mercury Elimination Strategy.
    - DEP worked with dental offices and hospitals to educate them on mercury-free alternative products and to safely collect and recycle unneeded mercury-containing products.
    - DEP worked to promote thermostat collection programs through support of NEWMOA and coordination with utilities.
    - DEP continued to perform oversight of municipal waste combustor Material Separation Plans. The mercury product diversion efforts made through these plans included:
        - a mercury awareness campaign,
        - thermometer swaps that captured more than 40,000 mercury thermometers,
        - outreach to contractors on thermostat collection that yielded more than 1,200 thermostats, and
        - reimbursements to municipal collection programs that collected 400,000 linear feet of fluorescent lamps and other mercury containing devices and elemental mercury estimated to contain between 250 and 300 kilograms of mercury.

- **School Chemical Management –**DEP provided 5 limited grants to fund school chemical cleanouts in FY 2003. DEP also supported local school systems by providing technical assistance and information on how they can properly manage and reduce hazardous chemical in schools, including developing a guidebook on school chemical management.

Municipal Waste Reduction

In FY03, DEP provided $350,000 of recycling equipment, education, and technical assistance grants to municipalities and regional groups. More information on these grants is provided below and in other sections of this update.

- **Pay-As-You-Throw (PAYT) Grants and Technical Assistance** – DEP provided assistance and incentives to help municipalities to design and implement PAYT programs. Supported by this assistance from DEP, four municipalities adopted PAYT to begin in summer 2003 and four more are planning to begin PAYT later in FY04. DEP's role included:
    - Provided second year funding to two municipalities that originally received grants in FY02. DEP also provided three PAYT grants in the form of funding for printing and mailing educational materials to residents.
    - Provided hands-on technical assistance through DEP staff and MRIP Coordinators to 11 municipalities to assist in planning and implementing PAYT.
    - Worked with more than 15 additional municipalities that are considering PAYT to provide information and guidance.
    - Performed public presentations, outreach activities, and interviews promoting PAYT throughout the Commonwealth.

- **Municipal Recycling Incentive Program (MRIP) Grants** – MRIP provides incentives for municipalities to strengthen their existing recycling, composting, hazardous product collection and buy recycled programs. DEP was able to provide more than 200 municipalities with over $1.3 million of Phase 1 payments of the FY03 MRIP program. Due to funding limitations Phase 2 of MRIP was suspended.
    - Participating municipalities increased their recycling tonnage by six percent compared with the preceding year.
    - New criteria for source reduction, commercial waste reduction, and toxics use reduction resulted in numerous new municipally sponsored business recycling programs, pesticide reduction initiatives, and municipal source reduction policies and plans.
    - DEP provided municipalities with technical assistance during the second phase of MRIP through MRIP coordinator staff time.

- **Municipal Technical Assistance, Workshops and Training** – DEP expanded assistance from DEP staff and MRIP Coordinators to municipalities and regional groups to help build local recycling capacity and provide information on increasing commercial and residential waste reduction in MA communities. FY03 accomplishments included:
    - DEP held the Annual Waste Reduction Forum in January 2003. In the past this Forum has focused specifically on hazardous products. But in 2003, the Forum was broadened to focus on other recycling and waste reduction issues. In particular, the Forum emphasized how to maintain progress during these tight fiscal times.
    - Conducted a series of workshops throughout the Commonwealth on various solid waste management issues including: solid waste and recycling contracting, source reduction in municipal operations, backyard and municipal composting, pesticide use reduction, commercial recycling workshops for municipalities, and municipal recycling coordinator training.
    - Provided technical assistance to municipalities in initiating and expanding programs to meet MRIP criteria.
    - Funded 10 technical assistance projects through direct grant awards.

- Through in-kind grants of MRIP coordinators, assisted more than 20 municipalities with local and regional recycling and waste reduction projects.

- **Municipal Recycling Equipment Grants** – DEP provided a limited number of small grants to municipalities and regional groups, including supporting three new curbside recycling programs and 4 municipal programs to enable small- to mid-sized businesses to recycle.

- **Education and Outreach –** Four recycling outreach grants were awarded focusing on targeted outreach.

- **Recycling Education Assistance to Public Schools (REAPS)** – Direct assistance for the REAPs programs was cut in FY03. Instead, DEP has relied on a workshop training to facilitate provision of REAPS services by municipal recycling officials, MRIP Coordinators, and other interested volunteers.

- **School Green Team –** DEP established the Green Team, an environmental club for Massachusetts schools that provides fun and interactive ways for students and teachers to reduce, reuse, recycle, and compost in their classrooms, schools, homes and communities. 220 schools representing 25,000 students signed up to participate in the Green Team program. Six new school recycling programs were initiated and 12 others were expanded. DEP supported these programs with grants for recycling bins, carts, and compost bins.

- **CRT Collection Infrastructure Program** – DEP phased out CRT recycling grants and charity collection partnerships at the end of calendar year 2002. DEP will continue to maintain a statewide electronics recycling contract to provide a cost-effective and convenient collection option for municipalities. As described above under product stewardship, DEP is working to transition from its charity partnership to a product stewardship arrangement with industry.

Commercial Waste Reduction

- **DEP Business Waste Reduction Assistance** – DEP implemented a number of initiatives in this area, including:
  - Worked with municipalities and MRIP Coordinators to establish business recycling partnerships in 10 municipalities.
  - Continued to encourage businesses to reduce waste and recycle through supporting WasteCap technical assistance programs.
  - Formalized a partnership with EPA and its national WasteWise recognition and assistance program. This partnership between DEP and EPA is the first of its kind nationally and will leverage increased resources to support business waste reduction efforts.
  - Provided limited grants to businesses, municipalities, and non-profit organizations promoting commercial recycling.

- **WasteCap Business Assistance –** DEP funded and assisted WasteCap programs to help businesses to reduce waste and increase recycling, including:
  - Conducted the Race to Recycle Challenge, a recycling competition for businesses and institutions.
  - Conducted 11 site visits.
  - Developed a searchable, web-based Recycling Services Directory to help businesses locate recycling companies that can serve them.

- Staffed a telephone hotline to answer business recycling questions.
- Revised and updated the WasteCap website.

- **Resource Management (RM)** – This program fosters innovative solid waste and recycling contracting that creates shared incentives for waste reduction for both business generators and RM service providers.
  - Supported the development and implementation of RM at three businesses.
  - Conducted a detailed review of EPA's RM manual.
  - Helped to plan and hold a RM workshop for hospitals that was attended by more than 30 participants.

- **Commercial and Institutional Food Waste Composting** – DEP implemented a number of programs in FY03 to increase the composting and other diversion of food waste, especially from commercial and institutional sources.
  - Completed a Food Waste Density Mapping Project and shared the report and the mapping capabilities with interested food waste generators, processors, and haulers. This project provides estimates of food waste generation and enables users to map where food waste is being generated and plan the development of collection and processing capacity to serve these generators
  - Continued to expand DEP's Supermarket Recycling Organics initiative, including:
    - Completed a CEO marketing package.
    - Completed a hands-on how-to workbook.
    - Provided direct technical assistance to more than 10 supermarkets, including Shaws, Big Y, and Whole Foods stores.
    - Continued to monitor results of diversion programs already in place at 12 Roche Brothers stores. Two stores alone have reported that they will save more than $60,000 per year in avoided disposal costs.
  - Assisted organic composting cooperatives through Wastecap and CET.
  - Developed new section of DEP web site on organics diversion.
  - Coordinated and managed the organics SWAC subcommittee.
  - Held DEP's annual Organics Summit in March 2003, which included more than 160 participants.

Recycling Market Development Programs

As part of DEP and EOEA's strategy to increase recycling and reuse, the Agencies have made significant investments in the State's waste reduction infrastructure by providing support to municipalities, consumers, and businesses. Many of the materials generated and collected in Massachusetts face market challenges due to economic and technical barriers. DEP and other state agencies are working to address the barriers associated with recycling market development through an array of financial and technical assistance programs. FY03 accomplishments include:

- **Recycling Industries Reimbursement Credit (RIRC)**– Provided three grants for $150,000, leveraging $150,000 in matching funds, to innovative demand-side recycling businesses to increase the demand for recyclable materials. These grants, which were focused on developing processing capacity for organics and plastics, provided capital equipment for composting companies to manage an estimated 11,000 tons of food waste per year. FY03 activities performed by DEP staff within this program included the designation of materials, awarding of RIRC grants, and the tracking of past recipient efforts.

- **Recycling Loan Fund (RLF)** – Two loans totaling $525,000 were made to a paper converter and an auto salvage business. These loans leveraged $2.5 million in additional financing.

- **Chelsea Center for Recycling and Economic Development** - The Chelsea Center continued to coordinate grant programs for research and development, trade show and intern assistance and recycling based community economic development projects. In FY03, these programs focused on construction and demolition debris and food waste. The Chelsea Center closed at the end of FY03. General requests for recycling market development information and assistance will be directed to DEP.

- **State Buy Recycled and Environmentally Preferable Purchasing** - EOEA continued to support the State's Operational Services Division to increase state and municipal purchases of recycled and environmentally preferable products, coordinate with national Buy Recycled initiatives, and plan the State's Conference and Vendor Fair for Buy Recycled and Environmentally Preferable Products.

- **Municipal Buy Recycled and Environmentally Preferable Purchasing** - DEP continued to encourage municipal recycled product purchasing through MRIP Buy Recycled criteria. However the MRIP criteria was only in effect for the first half of FY03.

- **Business Buy Recycled Programs –** Through WasteCap, DEP supported the Recycled Paper Purchasing Cooperative and provided other information and assistance to help businesses increase their purchases of recycled products.

Construction and Demolition Debris (C&D) Management Initiatives

- **C&D Disposal Ban** – DEP continued working with the C&D Subcommittee of the Solid Waste Advisory Committee (SWAC) to solicit a recommendation on initiating a disposal ban on certain construction and demolition debris. DEP is developing draft regulations and guidance based on the Subcommittee's recommendations and is planning to release the draft regulations for public hearings and comment by Fall 2004. (This will be part of a broader set of solid waste regulatory revisions discussed in the next section.)

- **C&D Technical Assistance Program** – This program was developed to increase the diversion of C&D materials from final disposal. DEP accomplishments in FY03 include:
    - Provided research and technical assistance to increase the reduction and recycling of C&D materials.
    - Gave more than 10 presentations on the proposed C&D disposal ban.
    - Coordinated C&D subcommittee and work groups.
    - Worked with C&D stakeholders to conduct C&D source separation pilot projects that will result in case studies and fact sheets to inform future efforts to reduce, reuse, and recycle C&D. These projects focused on developing source separation techniques and collecting economic data from a mix of urban and rural and public and private projects.
    - Awarded technical assistance grants and provided staff assistance to conduct C&D reuse and recycling projects, including developing C&D reuse and recycling specifications for a school renovation project and capturing residential C&D materials for reuse.
    - Began the development of a new C&D section of the DEP web site.
    - Completed a wood markets analysis.

Regulatory and Policy Changes and Development

- **Solid Waste Management Facility Regulation Revisions (310 CMR 19.000) –** Continued work on revising solid waste facility permitting regulations, including provisions for landfill double liner requirements, C&D waste ban and BUD provisions. These regulations are expected to go out for public comment by Fall 2003.

- **Other Solid Waste Policies –** Established a new policy to enable a pilot collection program for spent sharps generated from non-commercial sources, in-home medical use, and discarded sharps collected by public health and public safety personnel.

- **Solid Waste Permitting** – Issued solid waste permits, including:
    - Permitting new disposal capacity at landfills (as discussed in the previous section);
    - Permitting new C&D processing and transfer capacity, including a 1,000 ton per day (TPD) C&D processing facility, a 1,000 TPD transfer station, and expanding a transfer station from 49 TPD to 350 TPD; and
    - Approving 35 beneficial use determinations.

- **Risk Evaluation Protocol** – Revised DEP's *Risk Evaluation Guidance Document for Solid Waste Facility Site Assignment and Permitting*. The revised document will be released for public comment in Fall 2003. The revised guidance makes a number of improvements and clarifications to DEP's existing guidance for risk assessment at solid waste facilities, including clarifying requirements for assessing and remediating groundwater contamination and requirements for diesel emissions retrofits for on-site equipment. The updated guidance document is based on recommendations from DEP's Science Advisory Panel, which reviewed and commented on the Interim Guidance.

- **Landfill Closures** – Approved closures of inactive unlined landfills and conducted related assessment activities. Landfill closures that have begun over the past year include Brockton and the Cottage Street Landfill in Springfield. DEP has worked with applicants considering landfill closure projects at more than 10 other inactive landfills.

- **Waste Ban Compliance Strategy** – During FY03 waste ban compliance inspections were impacted when DEP lost two of its four dedicated waste ban inspectors and the waste ban program coordinator. However, DEP still completed more than 300 inspections and continued to receive reports that waste ban inspections at disposal facilities have prompted businesses and municipalities to increase their recycling programs. DEP also has conducted waste ban outreach to businesses by working with chambers of commerce and other business groups, distributing outreach materials on the waste bans, and by sending notices to businesses that repeatedly violate the waste bans.

- **Comprehensive Facility Inspections –** Including the above waste ban inspections, performed a total of more than 500 solid waste facility inspections and took necessary enforcement actions.

Waste Planning Projects

- **Comprehensive Waste Reduction Program Analysis** – Completed work begun in FY02 to prioritize DEP's efforts to reach our 2010 waste reduction goals. This project, relying on contracted work by the Tellus Institute, included an assessment of current and potential diversion by waste stream sector and provides recommendations for how DEP should prioritize efforts to reach the Master Plan's 70 percent waste reduction goal and the goal for convenient statewide hazardous product collection from households and small businesses by 2010. This project has assisted in providing a better basis for DEP to allocate resources in FY03 and beyond.

- **Solid Waste Progress Report and Data Gathering** – Continued core data surveys, (including the municipal recycling data sheets, the compost site report, recycling and C&D processors surveys), calculation of annual waste reduction rates, preparation of disposal capacity projections, and issuance of annual solid waste progress reports. DEP also continued the review of annual facility reporting for other solid waste facilities.
    - The release of the 2001 Solid Waste Progress Report was delayed until Summer 2003, so that DEP could have up-to-date economic data on which to base waste reduction rates for 2001. In the future the progress report will continue to be released on this same schedule, approximately 18 months after the end of each year.

- **Solid Waste Advisory Committee:** Continued to coordinate the Solid Waste Advisory Committee (SWAC) and subcommittee meetings in FY03. The following subcommittees were active in FY03:
    - **C&D Subcommittee:** The C&D subcommittee consists of a diverse group of more than 120 stakeholders representing all groups interested in C&D management. Meetings are held every two months and guest speakers are invited to discuss C&D diversion opportunities. Workgroup meetings are held in between full subcommittee meetings.
    - **Organics Subcommittee:** The Organics subcommittee met quarterly during 2003 to provide input to DEP on how to increase composting in Massachusetts. In particular, the subcommittee's discussions focused on increasing diversion of commercial and institutional food waste. The Subcommittee helped to plan the 2003 Organics Summit.
    - **Data Subcommittee:** The Data Subcommittee provides input to DEP on the state's solid waste, recycling, and waste reduction data. The Data Subcommittee meets on an as-needed basis with DEP staff to review draft data and data methodology issues.
    - **Regulatory Review Subcommittee:** The Regulatory Review Subcommittee conducted a detailed line-by-line review of DEP's draft solid waste regulatory revisions and provided input to DEP to ensure that the regulations are written clearly and consistently and accurately reflect DEP's intent.

APPENDIX A

Data Collection and Analysis

This Appendix describes how DEP collects and analyzes solid waste data.

Data Collection

Table A-1 shows the sources DEP relies on to track solid waste data. Each of the data sources is described below.

Table A-1: Major Solid Waste Data Sources

Data Type	Data Source
Disposal	• Annual Facility Reports
Imports / Exports	• Annual Facility Reports • Survey of Other States
MSW Recycling	• Survey of Commercial Recycling Processors • Survey of Municipalities • Bottle Bill Tonnage
Composting	• ***Composting Facility Reports*** • Survey of Municipalities • Residential Organic Waste Management Study
C&D Recycling	• ***Survey of C&D Processors***
Other C&D Diversion	• ***Annual Facility Reports*** • Survey of C&D Processors

Annual Facility Reports

In Massachusetts, all landfills, combustion facilities, transfer stations and handling facilities must submit annual reports to DEP summarizing the type and quantity of waste managed. Data from the landfill and combustion facility reports provide information regarding total tonnage of waste disposed in Massachusetts. The reports also contain information on the import and export of waste.

Survey of Other States

In addition to using Annual Facility Reports, DEP gathers information on the import and export of solid waste across state lines by contacting neighboring state solid waste management agencies and significant out-of-state facilities. DEP compares amounts from each of these sources and the largest import/export amount is used.

Municipal Recycling Survey

Each year, DEP surveys all 351 cities and towns in the Commonwealth to determine the quantity of waste recycled through municipal recycling programs. Recyclables counted are generated by single-family

homes and some multi-family residences. The survey also collects data on centralized (off-site) composting of leaf and yard waste that is used to determine the amount of residential composting[20] taking place at municipal and commercial composting facilities. DEP adjusts centralized composting of leaf and yard waste to account for non-reporting towns that operate leaf and yard waste collection programs. DEP does not adjust reported recycling tonnages to account for municipalities who did not report or whose data is incomplete. However, DEP does estimate waste generation for these municipalities. DEP uses a regression analysis based on the towns that do report and multiplies the resulting index of the amount of per capita waste generated (.40 tons per year) by the population of each town lacking generation data.

Composting Facility Reports

Each year, DEP sends a composting survey to all municipal and commercial composting sites. This survey provides the total centralized composting tonnage. To derive a base commercial composting[21] amount, the total amount of residential composting from the municipal recycling survey is subtracted from the total amount reported on the composting facility reports. 100,000 tons is added to the base commercial composting amount to account for farm composting which is not reported to DEP. This figure is an estimate from the Massachusetts Department of Food and Agriculture (DFA).

MSW Recycling Processors Survey

Each year, DEP surveys all known recycling processors in the state. For known processors that do not respond, their reported tonnages from the previous years are adjusted for average increases or decreases in recycling and carried over.

C&D Processors Survey

Each year, DEP surveys all known companies that process construction and demolition (C&D) debris for reuse. The companies are surveyed for information on the type and amount of material processed, and the results are used to estimate the C&D recycling rate. DEP attempts to contact all the processors that handle C&D waste. For quantities handled by known processors that do not respond, numbers from the last survey performed are adjusted for increases or decreases in recycling and carried forward.

Bottle Bill Tonnage

Bottle bill recycling results are credited toward the residential recycling rate. Container recovery (i.e., deposit redemption) rates are obtained from the Massachusetts Department of Revenue. DEP estimates the recycled tonnage using trade association data on both material composition (glass, aluminum, plastic, etc) of the beverage containers recovered and average unit weights for different container types. Composition percentages are adjusted based on information provided by deposit container collection companies to reflect the specific conditions in Massachusetts.

[20] Composting tonnage is considered residential if it originates from a residential source, regardless of where it is composted.

[21] Composting tonnage is considered commercial if it originates from a commercial source, regardless of where it is composted.

Data Calculations

The following formulas and definitions are used to estimate quantities in Table 3, Solid Waste Generation and Management, 1997 – 2001. The terms, emphasized in bold type, are presented in the same order in which they appear in the table. Also, completely lower case terms are not included in the table but are calculated in the data analyzed.

Potential Generation = Estimated Generation for 2001 based on multiplying 1990 generation by change in Gross State Product from 1990 to 2001. For 2001, Gross State Product figures were not readily available, so DEP used the Leading Economic Indicators Index as a surrogate for Gross State Product. (See below section on 2001 Methodology Changes for more detail on this issue.)

Source Reduction = Potential Generation – Actual Generation (listed separately for MSW and non-MSW)

Total Generation = In-State Disposal + Diversion + Disposal Exports – Disposal Imports

MSW Generation = MSW Disposed + MSW Diverted + MSW Exported - MSW Imported
- **Residential Generation** = Residential Recycling + Residential Composting + Residential On-site Composting + Bottle Bill + MSW Disposed.
- **Commercial Generation** = MSW Generation - Residential Generation

Non-MSW Generation = C&D + Other Non-MSW Generation
- **C&D Generation** = C&D Disposed + C&D Recycled + C&D Other Diversion + C&D exported – C&D imported
- **Other (non-MSW) Generation** = Other Disposed + Other diverted + Other exported – Other imported

Diversion = MSW Diversion + Non-MSW Diversion

MSW Diversion = Residential Recycling + Commercial Recycling + Residential Off-si-site Composting + Commercial Composting[22]
- **Residential Recycling** is estimated using municipal recycling survey data plus bottle bill data.
- **Commercial Recycling** = MSW Recycling (estimated using commercial processors survey and bottle bill data) - Residential Recycling
- **Residential Off-site Composting** is estimated using the municipal recycling survey data.
- **Commercial Composting** is estimated using composting facility report data – Residential Composting + DFA estimates for farm composting.

Non-MSW Diversion = C&D Recycling + C&D Other Diversion
- **C&D Recycling** is estimated using data from the C&D processors survey.
- **C&D Other Diversion** includes C&D fines used for landfill cover, wood burned as fuel, and C&D residuals used for inactive landfill closures.

Disposal = Landfill Disposal + Combustion Disposal + Disposal Exports – Disposal Imports

[22] Residential on-site composting, or home composting, is not counted as part of MSW Diversion, but instead as source reduction.

Disposal Exports and **Imports** are estimated using data from Annual Facility Reports and a survey of other states.

Landfill Disposal = MSW Disposal + C&D Disposal + Other Disposal

MSW Disposal is estimated using data from Annual Facility Reports

C&D Disposal is estimated using data from Annual Facility Reports

Other Disposal is estimated using data from Annual Facility Reports, and represents all non-MSW disposal other than C&D (e.g., contaminated media, recycling residues, industrial waste, street sweepings, etc.)

Combustion = MSW Combustion + non-MSW Combustion

MSW Combustion is estimated using data from Annual Facility Reports

Non- MSW Combustion is estimated using data from Annual Facility Reports

Methodology Changes for 2001

- **Counting C&D Fines and Wood for Fuel**
  In order to better account for materials generated in Massachusetts, DEP added an additional diversion category. This category is titled "C&D Other Diversion" and consists of C&D Fines and Wood for Fuel. These materials are considered to be beneficially used, as opposed to recycled or disposed and therefore are counted in generation and diversion rates (but not in recycling rates or disposal tonnage).

- **Gross State Product for Calculating Potential Generation and Source Reduction**
  DEP uses an economic driver to calculate potential generation and source reduction. In this methodology, DEP estimates what generation would have been in the current year if generation had increased in line with the Gross State Product figure. The difference between this potential generation and actual generation is attributed to source reduction. For 2000, DEP used an estimated Gross State Product figure that was later revised, resulting in the initially reported 2000 waste reduction of 54 % changing to 57 %. In order to avoid this type of change in the future, DEP has decided to wait for final GSP figures before calculating source reduction and our waste reduction rate. These figures are typically available 18 months after the end of the given calendar year.

- **Estimation Of Growth Rates For MSW Generation, Recycling And C&D Diversion Rate**
  The Beyond 2000 Solid Waste Master Plan projected that MSW Generation would increase 1.5% per year until 2006, and then level off, MSW Recycling would increase 1.4% per year, and the Non-MSW Recycling rate would reach a rate of 85% by 2006 and level off.

  In 2002, these assumptions were changed to better reflect what has happened over the past 3 years. A 3-year rolling average for MSW generation results in an increase of 1% per year, and MSW recycling increase of 0.85% a year, and the Non-MSW Recycling Rate was changed to the C&D Diversion Rate (to better account for all materials being generated, recycled and otherwise diverted from disposal). Since other materials are being accounted for, the projection has been changed to reach 88% by 2010.

- **Carry Over Of Survey Tonnage**
  Each year, DEP surveys recycling processors. In the past, if a facility did not respond to the survey, DEP carried forward the facility's tonnage reported for the previous or most recent year.

  In order to get a better estimate of the recycling and composting tonnage for those facilities surveyed that did not respond to the 2001 survey but did respond to the 2000 survey, DEP applied a % change, reflecting the average change in tonnage reported by all processors.

  Recycling processors that reported both in 2000 and 2001 showed on average a decrease of 11% in recycled tonnage, and compost facilities reported an increase of 9%, compared to companies that reported in 2000. DEP applied these averages to companies that reported in 2000 but not in 2001 to generate a more conservative and more accurate estimate of their 2001 tonnage.